ABSTRACT

Thermal and moisture regime of patterned ground is closely associated with the presence of the regelation phenomenon. Generally, the regelation includes all processes leading to the water freeze-thaw alternations in soil or bedrock. As a result of cyclic freezing and thawing of soil water under specific conditions, processes, such a moisture migration, ice segregation or frost heaving, operate. Termal and moisture regime is the main factor of these processes and consequentely, of the patterned ground formation. The submited diploma thesis is concerned with thermal and moisture regime of patterned ground in the High Tatras. The main aims of the thesis was to characterize thermal and moisture regime of patterned ground, to evaluate and confront the patterned ground regelation activity depending on the diverse soil depths and different types of the patterned ground and to evaluate the soil temperature relationship to the air temperatures, soil moisture content and the water level regime of the nearest lakes. The partial purpose of the thesis was to assess the applicability of different methods of the regelation cycle determination based on the soil temperature measurements. During the study period 2007 – 2012 the regelation activity of sorted paterned ground (Hincove oká, Lúčne sedlo and Skalnaté pleso sites) and soil hummocks (Kopské sedlo site) was evaluated. The results showed diferences in the thermal regime between the diverse patterned ground types, as well as among separete forms within the study localities. The regelation seasons of the sorted patterned ground started earlier, ended later and as a consequence, their duration lasted longer than in the earth hummocks in all depths of the soil profile. The onset of the regelation seasons penetrated soil from its surface with longer delay between the depths of 15 and 30 cm than 5 and 15 cm. The statistical analysis of the regelation characteristics showed a substantial relationship between start, end and duration of the regelation seasons when the study sites regelation activity was compared. Based on the soil relative moisture curves, the longest (seasonal) regalation cycles were determined according to the longest soil-temperature-data regelation cycles. The soil moisture regime varied between the Hincove oká and the Kopské sedlo patterned ground, especially due to the spring variability of the water level on the Hincove oká site.

Key words: freeze-thaw processes, temperature regime, patterned ground, High Tatras